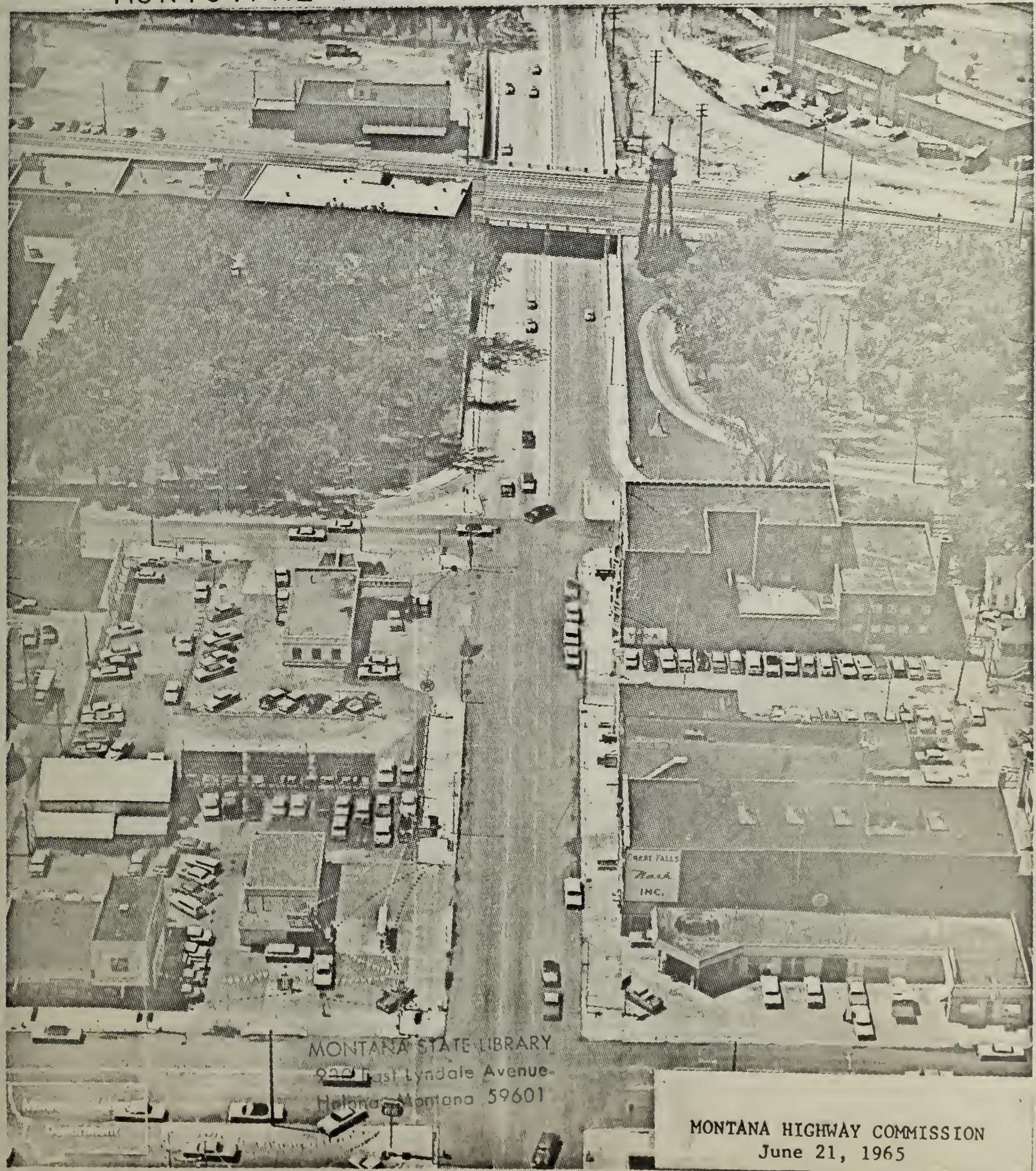


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COST ANALYSIS
MUNICIPAL PORTION OF SELECTED PROJECTS

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COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

The Montana Highway Commission, at its April 1965 meeting, expressed a desire for more information regarding the cost of constructing curbs, parking and other urban elements. This report was prepared with the objective of providing information on this subject.

Eight projects which were contracted during the period 1959-1964 were selected as being a representative sample of the municipal projects currently being built. This report deals only with the portions of the projects which are within city limits and which were constructed as a municipal section, i.e., a section with curbs and gutters and parking.

In Exhibit A, Item I shows the actual amount the city paid toward construction of the project; Item II shows the actual costs from department cost records, and Item III shows the results of a simplified cost analysis. Exhibit B for each of the projects shows the typical section to which the project was actually built and the typical section which would have to be built to carry the same traffic in a rural area.

The simplified cost analysis, the results of which are shown in both Exhibit A and Exhibit B, requires some explanation. The object is to determine how much of the cost is attributable to the construction of parking, curbs, drainage systems and other urban elements. A precise answer could be obtained only by a complete redesign of the project minus the above urban elements. It is felt that a reasonable approximation is achieved as described below.

The cost of building a rural roadway section on the same ground to serve the same traffic, but without the urban elements referred to above, is estimated. The actual cost of the municipal section as built minus the estimated cost of the rural section referred to above gives the estimated cost of constructing the curbs, parking and the other urban elements. It should be emphasized that the analysis results in an estimate only of the construction cost of the urban elements - the elements not required to serve the traffic on the road, but required because the road is being built in a city. Costs of right-of-way and utilities are not included in the simplified cost analysis. The simplified cost analysis does not deal with any of the other factors which make construction in a city more expensive.

The Instructions for Preparation of Simplified Cost Analysis on the following page provide detailed information as to the method used in estimating the cost of the rural section.

Table A on Page 3 summarizes the results of the analysis and compares the actual city contribution with the amount of benefit the city receives in terms of construction of urban elements not required to serve the vehicular traffic.

INSTRUCTIONS FOR PREPARATION OF SIMPLIFIED COST ANALYSIS

OBJECT

Take the total cost of the urban section of several typical jobs and determine (1) the total construction cost of the urban section as built, including parking, curbs, and other urban items, (2) what construction cost of the same urban section of the same project would have been if we had built a rural roadway section adequate to carry the traffic but without parking, curbs, or other items unique to the urban section.

METHOD

Item 1, the actual cost of the section as built, can be obtained by taking all quantities in the urban section times the low bidder's unit prices.

Item 2, the estimate of what the cost would have been if a rural section had been built, should be estimated as follows:

- A. Curbs, storm sewer items, median items, and other similar items would not be required if a rural section were built and need not be included in the estimate for the rural section.
- B. Many items are bigger or wider on an urban section because the section itself is wider. The quantity of these items which would exist on a rural section should be estimated by the proportion which the width of rural section bears to the width of the urban section.

Example: Excavation items and drainage items.

- C. A few items would exist in the rural section in the same quantities as on the urban section.

Example: Project and station markers, lump sum remove and adjust items.

- D. The estimated cost of the rural section will be obtained by multiplying the quantities from Nos. 2, 3 and 4 above times the low bidder's unit prices.

A very faint, large watermark-like image of an old document occupies the background. It appears to be a ledger or account book with multiple columns of handwritten text and figures. The text is mostly illegible but suggests entries like "Debit" and "Credit" followed by various amounts.

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<http://archive.org/details/costanalysismuni01mont>

TABLE A
SUMMARY OF ANALYSIS

PROJECT NUMBER	CITY	ACTUAL CITY PAYMENT	TOTAL COST	SIMPLIFIED COST ANALYSIS			RATIO OF BENEFITS TO CITY PAYMENT
				MUNICIPAL SECTION	NON-MUNICIPAL SECTION	COST OF URBAN ELEMENTS 2/	
F 115 (14)	Harlowton	\$ 49,287	\$ 289,536	\$ 173,399	\$ 94,645	\$ 78,754	1.60
F 239 (13)	White Sulphur Spgs.	47,058	253,305	185,562	103,322	82,240	1.75
F 264 (8)	Townsend	101,259	318,739	318,739	126,258	192,481	1.90
F 67 (9)	Conrad	129,398	400,754	400,754	166,884	233,870	1.80
U 112 (3), 229(15) & 235(32)	Lewistown	67,110	433,523	430,278	271,730	158,548	2.36
F 86 (19)	Baker	49,842	199,366	190,945	130,277	60,668	1.22
U 257 (14) & F 270 (7)	Kalispell	110,000	491,682	320,463	242,818	77,645	0.70
S 193 (1)	Valier	7,800	31,889	31,086	6,179	24,907	3.20
TOTALS -----		\$561,754	\$2,418,794	\$2,051,226	\$1,142,113	\$909,113	1.62

1/ Does not include right-of-way and utilities.

2/ The cost of curbs, parking and other urban elements equals the cost of the Municipal Section minus the cost of the N Municipal Section.

3/ The total cost of the curbs, parking, etc., are classed as city benefits because they benefit the city and are not necessary to serve the traffic on the road. This ratio represents the number of dollars of city benefits (construct of urban elements) per dollar of city payment.

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. F 115 (14)

Project Name Harlowton

Year Contracted 1964

Designed for 6300 Average Daily Traffic

I Actual City Payment

<u>TOTAL</u>	<u>\$49,287</u>
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II Actual Costs *

Construction	<u>\$154,055</u>
Preconstruction Engineering	<u>8,645</u>
Construction Engineering	<u>15,404</u>
Subtotal	<u>\$178,104</u>
Right of Way	<u>69,275</u>
Utilities	<u>42,157</u>
<u>TOTAL</u>	<u>\$289,536</u>

* - Project not complete.
Data taken from
Project Agreement
Estimate.

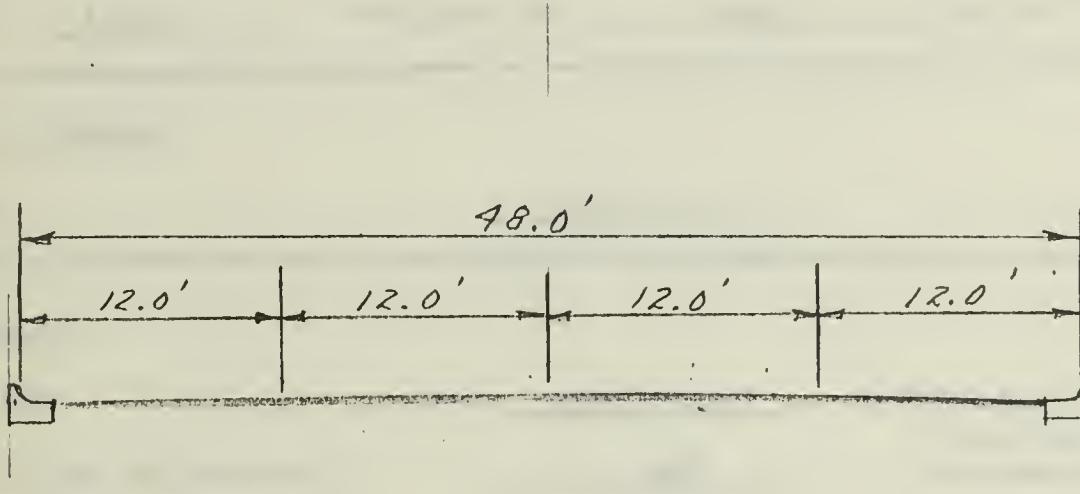
III Simplified Cost Analysis

	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$148,803</u>	<u>\$ 82,774</u>
Preconstruction Engineering	<u>4,464</u>	<u>2,483</u>
Construction Engineering	<u>14,880</u>	<u>8,277</u>
Subtotal	<u>\$168,147</u>	<u>\$ 93,534</u>
Other Construction	<u>5,252</u>	
Other Items		
<u>TOTAL</u>	<u>\$173,399</u>	<u>\$ 94,645</u>

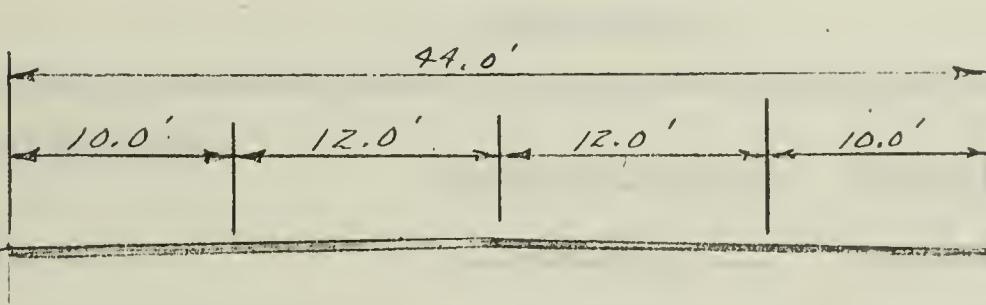
COMPARATIVE COST ANALYSIS - URBAN PROJECTS

Object No. F-115(14)Project Name HarlowtonYear Contracted 1964Designed for 6300 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 148,802.57Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 82,774.28

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. <u>F 239 (13)</u>	Project Name <u>White Sulphur Springs</u>
Year Contracted <u>1964</u>	Designed for <u>8800</u> Average Daily Traffic

I Actual City Payment

TOTAL	<u>\$47,058</u>
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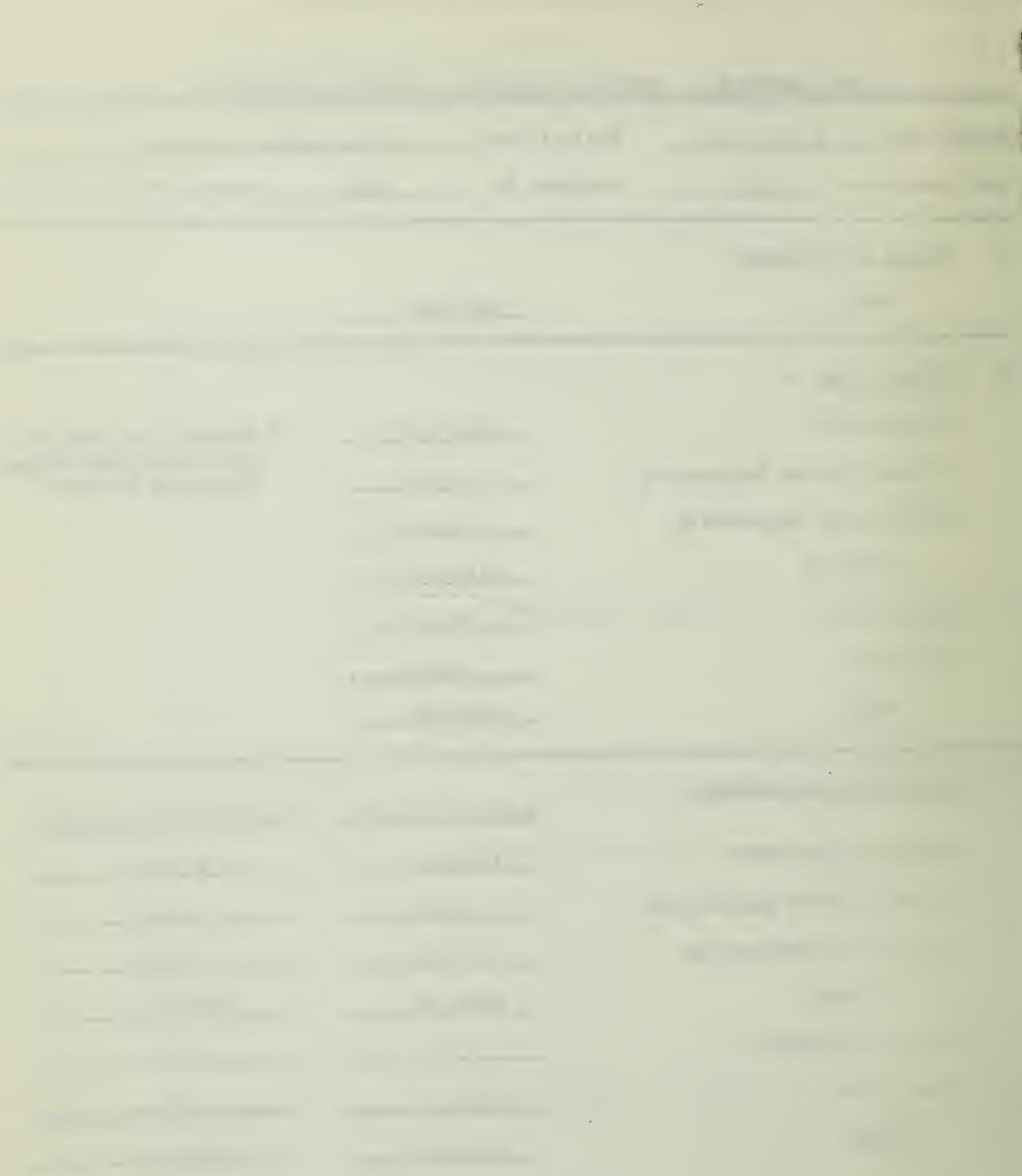
II Actual Costs *

Construction	<u>\$154,255</u>
Preconstruction Engineering	<u>15,883</u>
Construction Engineering	<u>15,424</u>
Subtotal	<u>\$185,562</u>
Right of Way	<u>64,317</u>
Utilities	<u>3,426</u>
TOTAL	<u>\$253,305</u>

* Project not complete.
Data taken from Project
Agreement Estimate.

III Simplified Cost Analysis

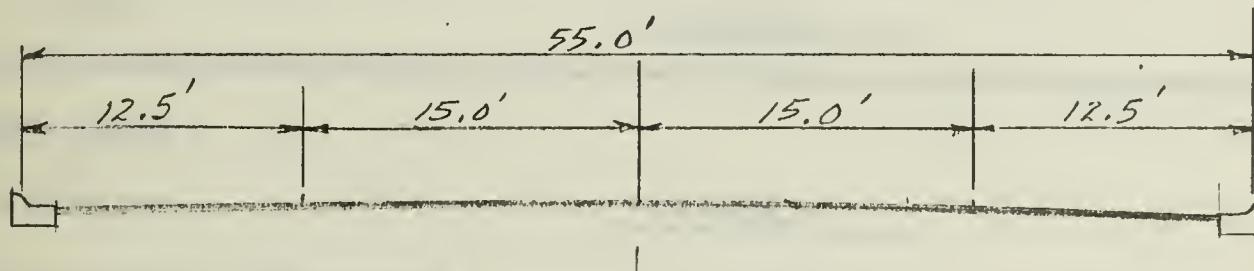
	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$154,255</u>	<u>\$ 85,912</u>
Preconstruction Engineering	<u>15,883</u>	<u>8,810</u>
Construction Engineering	<u>15,424</u>	<u>8,600</u>
Subtotal	<u>\$185,562</u>	<u>\$103,322</u>
Other Construction	<u>---</u>	<u>---</u>
Other Items	<u>---</u>	<u>---</u>
TOTAL	<u>\$185,562</u>	<u>\$103,322</u>



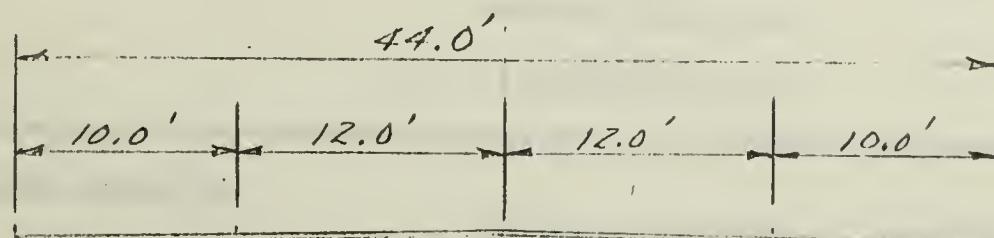
COMPARATIVE COST ANALYSIS -- URBAN PROJECTS

Object No. F-239(13)Project Name White Sulphur SpringsYear Contracted 1964Designed for 8800 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 154,255.36Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 85,911.63

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. F 264 (8) Project Name Townsend
 Year Contracted 1963 Designed for 7000 Average Daily Traffic

I Actual City Payment

<u>TOTAL</u>	<u>\$101,259</u>
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II Actual Costs

Construction	<u>\$235,413</u>
Preconstruction Engineering	<u>4,414</u>
Construction Engineering	<u>78,912</u>
Subtotal	<u>\$318,739</u>
Right of Way	<u>---</u>
Utilities	<u>---</u>
<u>TOTAL</u>	<u>\$318,739</u>

III Simplified Cost Analysis

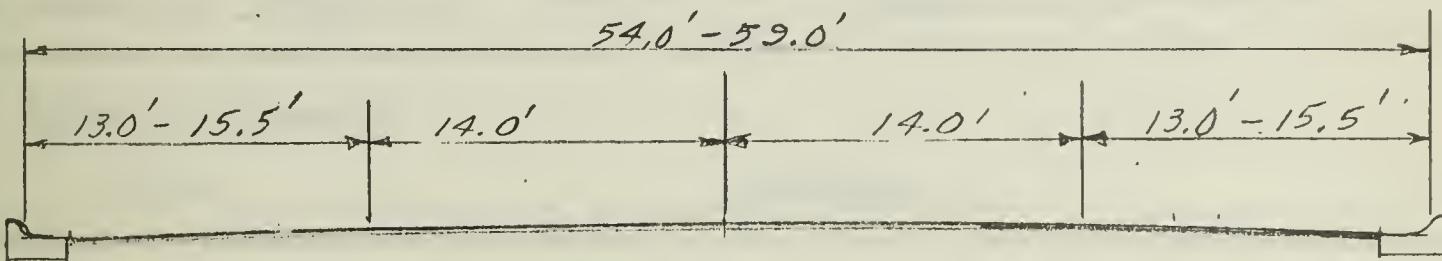
	Municipal Section	Non-Municipal Section
Regular Construction	<u>\$120,237</u>	<u>\$ 74,618</u>
Preconstruction Engineering	<u>4,414</u>	<u>2,740</u>
Construction Engineering	<u>78,912</u>	<u>48,900</u>
Subtotal	<u>\$203,563</u>	<u>\$126,258</u>
Other Construction	<u>1. 115,176</u>	<u>---</u>
Other Items	<u>---</u>	<u>---</u>
<u>TOTAL</u>	<u>\$318,739</u>	<u>\$126,258</u>

1. Storm Sewers.

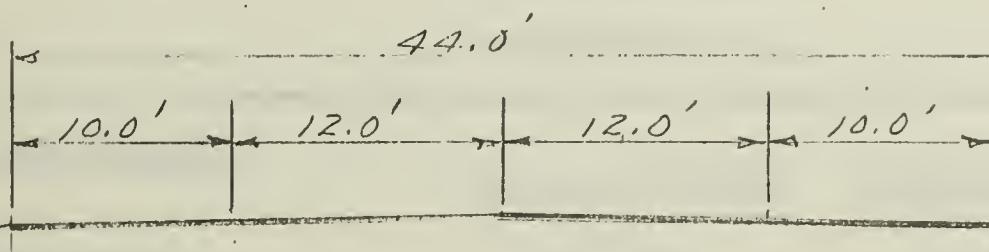
COMPARATIVE COST ANALYSIS - URBAN PROJECTS

Project No. F-264(8)Project Name TownsendYear Contracted 1963Designed for 7000 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 120,236.74Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 74,618.20

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. <u>F 67 (9)</u>	Project Name <u>Conrad-Main Street</u>	
Year Contracted <u>1962</u>	Designed for <u>5000</u>	Average Daily Traffic

I Actual City Payment

TOTAL	<u>\$129,398</u>
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II Actual Costs

Construction	<u>\$308,703</u>
Preconstruction Engineering	<u>22,110</u>
Construction Engineering	<u>69,941</u>
Subtotal	<u>\$400,754</u>
Right of Way	<u>---</u>
Utilities	<u>---</u>
TOTAL	<u>\$400,754</u>

III Simplified Cost Analysis

	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$169,665</u>	<u>\$108,184</u>
Preconstruction Engineering	<u>22,110</u>	<u>14,100</u>
Construction Engineering	<u>69,941</u>	<u>44,600</u>
Subtotal	<u>\$261,716</u>	<u>\$166,884</u>
Other Construction	<u>1. 12,947</u>	<u>---</u>
Other Items	<u>2. 126,091</u>	<u>---</u>
TOTAL	<u>\$400,754</u>	<u>\$166,884</u>

- . Sidewalks, Manholes, Valve Boxes - 100% City Funds.
- . Storm Sewers - City paid 43.18% = \$54,446.

COMPARATIVE COST ANALYSIS - URBAN PROJECTS

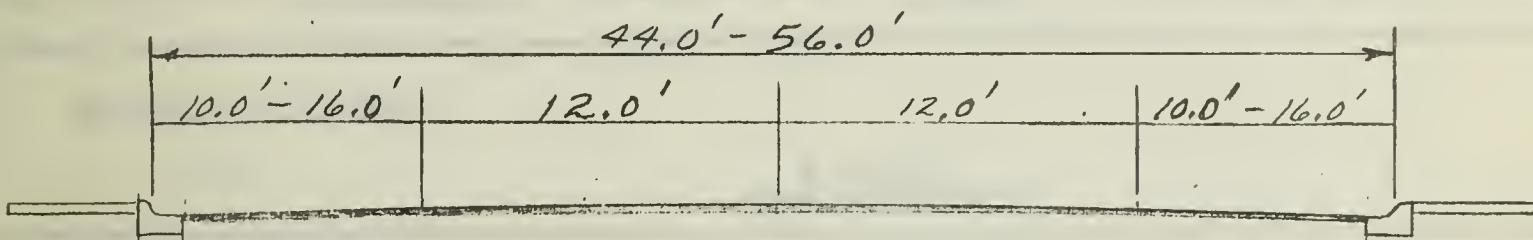
Object No. F-67(9)

Project Name Conrad-Main St.

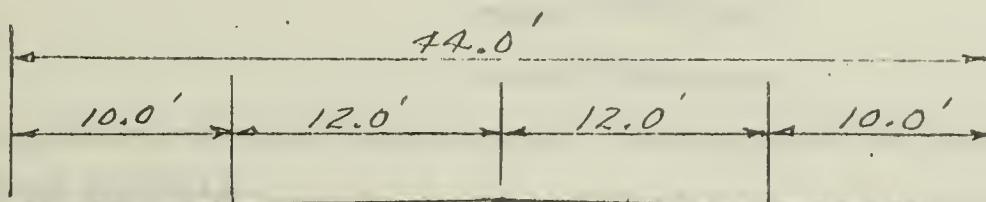
Year Contracted 1962

Designed for 5000 ADT

TYPICAL SECTION:

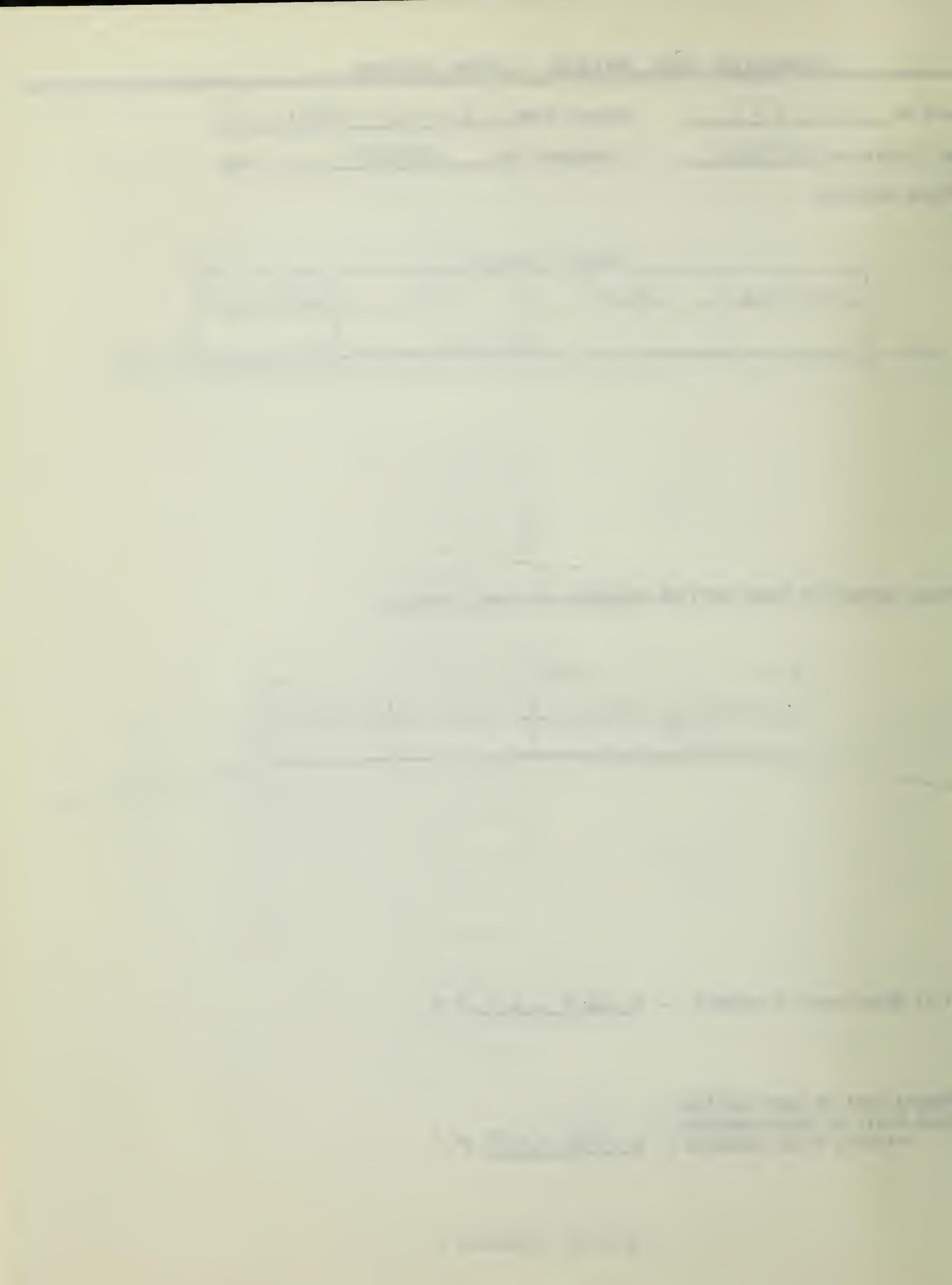


TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:



Cost of Urban part of project - \$ 162,665.24

Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 108,184.12



COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. <u>U 112(3), 229(15)</u> <u>& 235 (32)</u>	Project Name <u>Lewis town</u>	
Year Contracted <u>1962</u>	Designed for <u>8800</u>	Average Daily Traffic

I Actual City Payment

TOTAL	<u>\$ 67,110</u>
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II Actual Costs

Construction	<u>\$344,665</u>
Preconstruction Engineering	<u>22,073</u>
Construction Engineering	<u>63,540</u>
Subtotal	<u>\$430,278</u>
Right of Way	<u>---</u>
Utilities	<u>3,245</u>
TOTAL	<u>\$433,523</u>

III Simplified Cost Analysis

	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$300,328</u>	<u>\$188,130</u>
Preconstruction Engineering	<u>22,073</u>	<u>13,800</u>
Construction Engineering	<u>63,540</u>	<u>39,800</u>
Subtotal	<u>\$385,941</u>	<u>\$241,730</u>
1) 821		
2) 43,516		<u>30,000</u>
Other Items	<u>---</u>	<u>---</u>
TOTAL	<u>\$430,278</u>	<u>\$271,730</u>

- 1) Remove & Replace Curb & Gutter.
- 2) Structure over 20' Span.

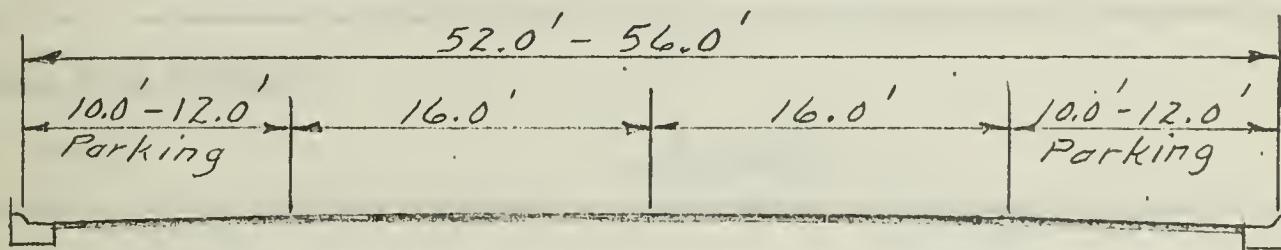


COMPARATIVE COST ANALYSIS - URBAN PROJECTS

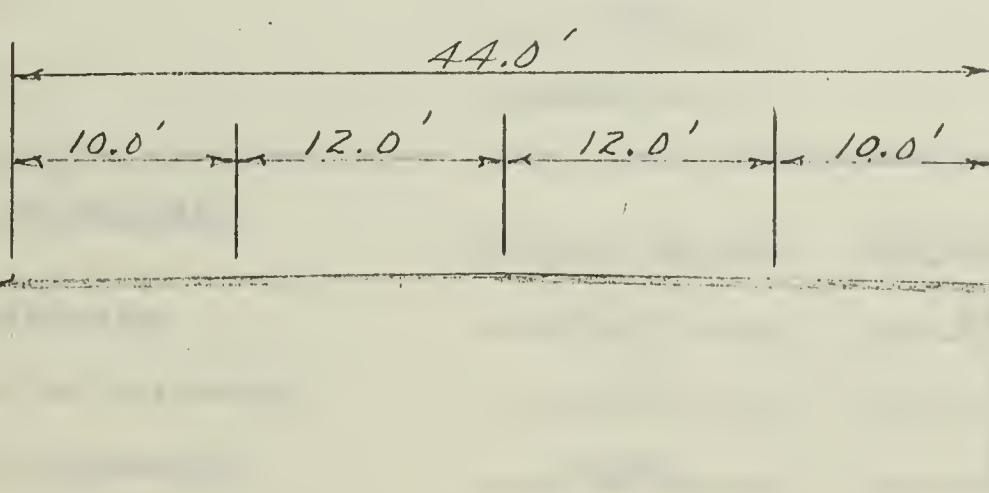
U-112(3), U-229(15)

Object No. U-235(32)Project Name LewistownYear Contracted 1962Designed for 8800 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 300,327.58Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 188,130.25

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No. F 86 (19) Project Name Baker-Montana Ave.
 Year Contracted 1961 Designed for 3700 Average Daily Traffic

I Actual City Payment

<u>TOTAL</u>	<u>\$ 49,842</u>
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II Actual Costs

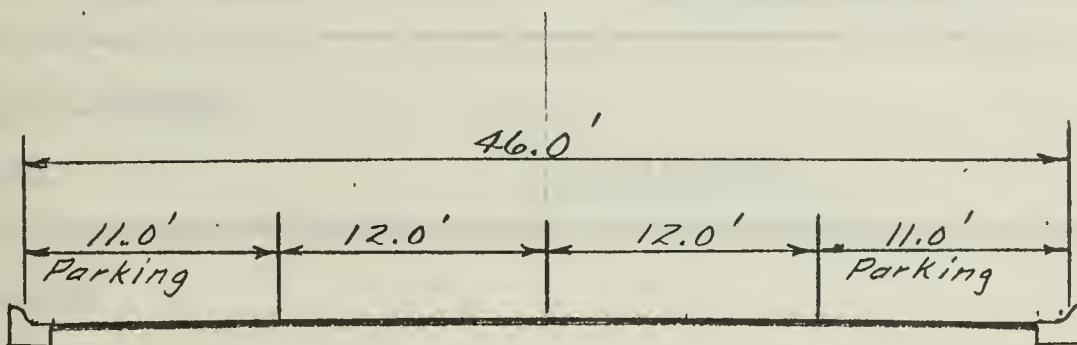
Construction	<u>\$162,571</u>
Preconstruction Engineering	<u>8,092</u>
Construction Engineering	<u>20,282</u>
Subtotal	<u>\$190,945</u>
Right of Way	<u>5,402</u>
Utilities	<u>3,019</u>
<u>TOTAL</u>	<u>\$199,366</u>

III Simplified Cost Analysis

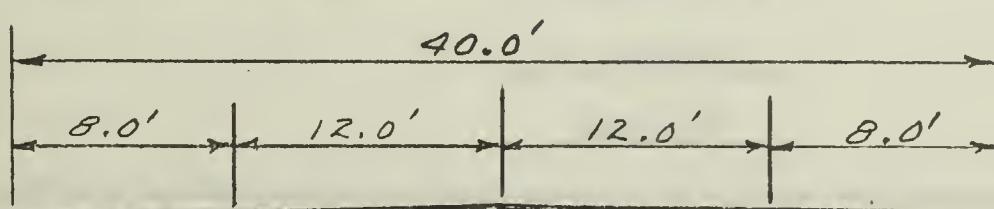
	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$162,571</u>	<u>\$110,967</u>
Preconstruction Engineering	<u>8,092</u>	<u>5,510</u>
Construction Engineering	<u>20,282</u>	<u>13,800</u>
Subtotal	<u>\$190,945</u>	<u>\$130,277</u>
Other Construction	<u>---</u>	<u>---</u>
Other Items	<u>---</u>	<u>---</u>
<u>TOTAL</u>	<u>\$190,945</u>	<u>\$130,277</u>

Object No. F-86(19)Project Name Montana Ave.-BakerYear Contracted 1961Designed for 3700 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 162,571.48Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 110,967.10

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

U 257 (14) &		
<u>Project No. F 270 (7) U-1</u>	<u>Project Name</u>	<u>Kalispell</u>
<u>Year Contracted 1959</u>	<u>Designed for 9100</u>	<u>Average Daily Traffic</u>

I Actual City Payment

<u>TOTAL</u>	<u>\$110,000</u>
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II Actual Costs

Construction	<u>\$279,701</u>
Preconstruction Engineering	<u>11,073</u>
Construction Engineering	<u>29,689</u>
Subtotal	<u>\$320,463</u>
Right of Way	<u>148,705</u>
Utilities	<u>22,514</u>
<u>TOTAL</u>	<u>\$491,682</u>

III Simplified Cost Analysis

	<u>Municipal Section</u>	<u>Non-Municipal Section</u>
Regular Construction	<u>\$264,566</u>	<u>\$210,508</u>
Preconstruction Engineering	<u>11,073</u>	<u>8,760</u>
Construction Engineering	<u>29,689</u>	<u>23,550</u>
Subtotal	<u>\$305,328</u>	<u>\$242,818</u>
Other Construction	<u>1. 8,857</u>	<u>---</u>
Other Items	<u>2. 5,113</u>	<u>---</u>
<u>TOTAL</u>	<u>3. 1,165</u>	<u>---</u>
	<u>\$320,463</u>	<u>\$242,818</u>

1. Sewer Trench & Manholes.
2. Traffic Signals
3. Removal of Trees & Shrubs

COMPARATIVE COST ANALYSIS - URBAN PROJECTS

U-257(14)

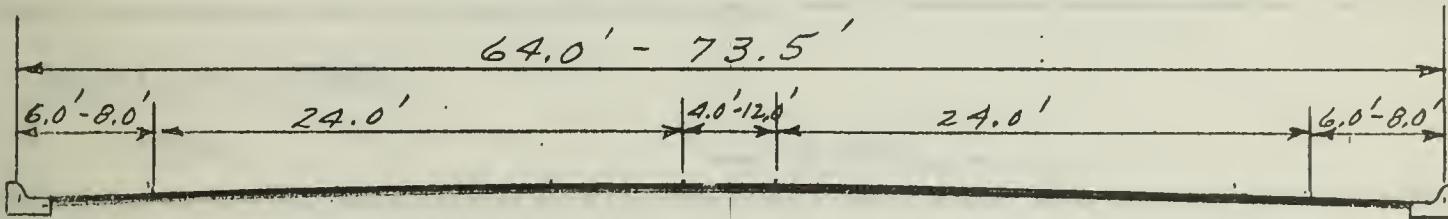
Object No. F-270(7) U-1

Project Name Kalispell

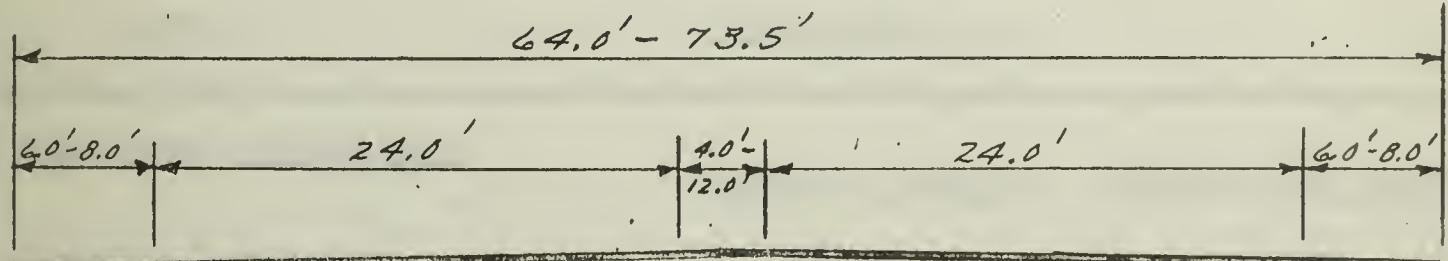
Year Contracted 1959

Designed for 9100 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:



Cost of Urban part of project - \$ 264,565.97

Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 210,508.18

COST ANALYSIS - MUNICIPAL PORTION OF SELECTED PROJECTS

Project No.	S 193 (1)	Project Name	Valier
Year Contracted	1959	Designed for	260
			Average Daily Traffic

I Actual City Payment

TOTAL	\$ 7,800
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II Actual Costs

Construction	\$25,485
Preconstruction Engineering	1,036
Construction Engineering	4,565
Subtotal	\$31,086
Right of Way	---
Utilities	803
TOTAL	\$31,889

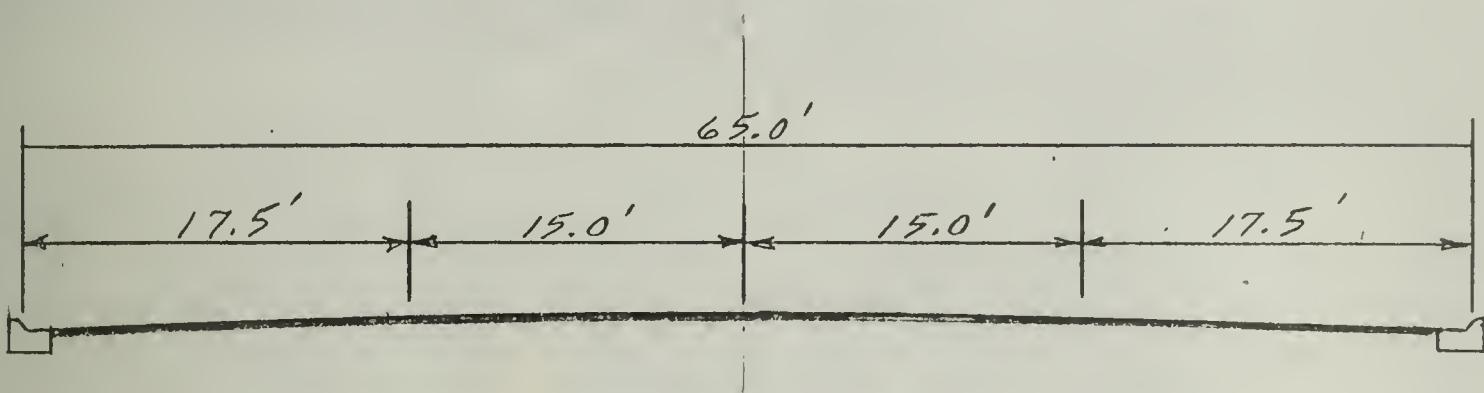
III Simplified Cost Analysis

	Municipal Section	Non-Municipal Section
Regular Construction	\$25,485	\$ 5,069
Preconstruction Engineering	1,036	205
Construction Engineering	4,565	905
Subtotal	\$31,086	\$ 6,179
Other Construction	---	---
Other Items	---	---
TOTAL	\$31,086	\$ 6,179

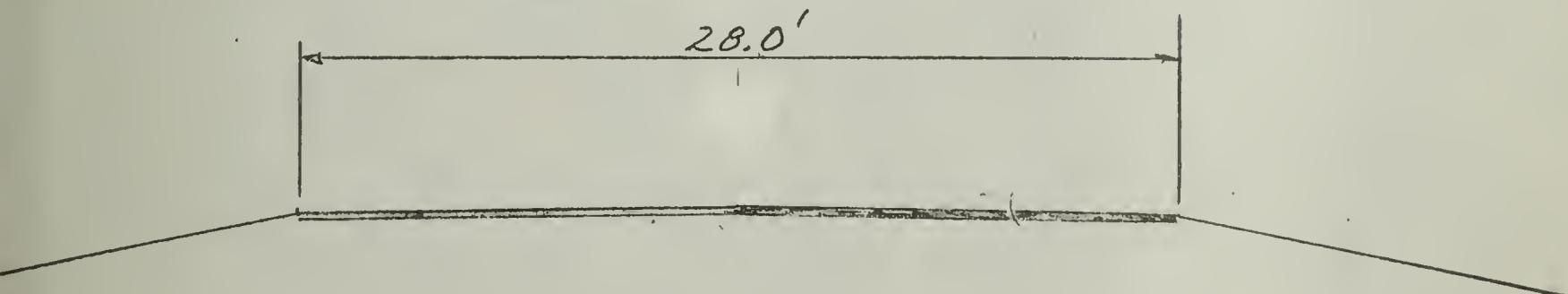
COMPARATIVE COST ANALYSIS - URBAN PROJECTS

ject No. 5-193(1)Project Name VolierYear Contracted 1959Designed for 260 ADT

TYPICAL SECTION:



TYPICAL SECTION OF RURAL SECTION REQUIRED FOR SAME TRAFFIC:

Cost of Urban part of project - \$ 25,484.71Estimated Cost of same section
of road built to Rural section
without Urban Elements - \$ 5,069.49

